Vol. 85, No. 45, pp. 509–522 30 December 1972

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

# THE CUBAN *ANOLIS SPECTRUM* COMPLEX (SAURIA, IGUANIDAE)

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*Anolis spectrum* W. Peters is one of a group of three species Cuban anoles (including *A. cyanopleurus* Cope and *Anolis alutaceus* Cope) characterized by an attenuate shape and a dorsal zone of greatly enlarged scales, but with either smooth (*alutaceus*) or keeled (*spectrum, cyanopleurus*) ventral scales. Of the three included species, only *A. alutaceus* has been well represented in collections, and both *A. spectrum* and *A. cyanopleurus* have long been considered quite rare. W. Peters described *A. spectrum* on the basis of two specimens sent to him by the noted Cuban zoologist Juan Gundlach; in addition to these two syntypes (which are a male and a female), there was a third specimen which was sealed in a jar in La Habana so that the delicate lizard would not be destroyed by students. Barbour and Ramsden (1919:150) examined the La Habana specimen at a distance and characterized it as "a strange looking wraith of a lizard." The original material apparently was secured by Gundlach in the jurisdictions of Matanzas and Cárdenas in west-central Cuba (Gundlach, 1875:358; 1880:51), and no individuals of the species were taken until Dunn (1926) found *A. spectrum* in the mountains near Soledad (= Sierra de Trinidad) in south-central Las Villas Province, about 180 kilometers to the southeast of Gundlach's specimens.

No further records of *A. spectrum* appeared until that of Schwartz and Ogren (1956:98); they secured a female specimen north of Santiago de Cuba, Oriente Province, some 470 kilometers southeast of Dunn's Sierra de Trinidad records. Ruibal (1964:509) noted that the species is presently known

only from the Sierra de Trinidad, but that Gundlach had collected the type-material in Matanzas. Ruibal's comment that "The destruction of the forest in most of lowland central Cuba may have destroyed this species in all areas outside the Sierra de Trinidad" is reasonable; Ruibal stated, without examination of the lizard, that the presumed *A. spectrum* recorded by Schwartz and Ogren from Oriente was probably an erroneous identification.

Under the auspices of National Science Foundation grants G-3865 and G-6252, Schwartz collected *Anolis spectrum* in the Sierra de Trinidad in 1957 and 1960, and found the species to be very easily secured in the area about Topes de Collantes in that range. It was not until 1964 that Garrido secured *A. spectrum* in Pinar del Río Province at the Valle de Pica Pica, about 200 kilometers west of the Gundlach locality for the type-material. Further collecting in the Pica Pica region by Garrido with Luis Moreno, Miguel L. Jaume, and Günther Peters resulted in their securing of a series from this region. A third visit to Pica Pica was made by Garrido with Jaume and George Gorman in 1967. Garrido also examined the La Habana specimen which had been sealed by Gundlach; finding that there were certain discrepancies between the description of *A. spectrum* given by Ruibal and others (based on Sierra de Trinidad specimens) and the characteristics of the Gundlach specimen from Matanzas Province, Garrido visited the Sierra de Trinidad to collect specimens in that range and then made a special effort to secure specimens from Matanzas Province, since these might in a broad sense be considered topotypic. In this latter quest, Garrido was successful, since he secured three specimens at San Miguel de los Baños, in March 1969, and eight in August 1969, the first "topotypes" of *A. spectrum* taken since Gundlach's original material. Additional specimens were collected at San Miguel by Raul Shelton in 1969 and by Garrido in 1970. Thus, single individuals to moderate or extensive series of *A. spectrum* are now available from four widely separated areas in Cuba—Pica Pica in Pinar del Río, San Miguel de los Baños in Matanzas, the Sierra de Trinidad in Las Villas, and near Santiago de Cuba in Oriente. Study of some of these lizards convinced Garrido that there were two distinct species involved, since those from Pinar del Río and

Matanzas resembled each other in many details, whereas those from Las Villas differed from the more western lots in ways that he interpreted as being on a specific level. Garrido communicated these facts to Schwartz, who in turn borrowed the *A. spectrum* in American collections; study of all this material readily confirms Garrido's assumption: there are two species presently confounded under the name *Anolis spectrum.*

Günther Peters (1970) meanwhile had studied the 21 specimens of *A. spectrum* collected by him in Cuba in 1967 (on the Erste Kubanisch-Deutschen Alexander von Humboldt-Expedition der Deutschen Akademie der Wissenschaften zu Berlin and conjointly sponsored by the Academia de Ciencias de Cuba) along with the W. Peters syntypes. Peter's 1967 specimens included three from Pica Pica and 18 from the Sierra de Trinidad at Arroyo La Mariposa. On the basis of these Pica Pica lizards, Peters named *Anolis spectrum sumiderensis.* In the light of Garrido's specimens, the lizards which G. Peters considered *A. s. spectrum* are in actuality representatives of the eastern species, rather than related subspecifically to *sumiderensis* which resembles near-topotypic *A. spectrum* (sensu stricto, from Matanzas Province). Accordingly, we herein reexamine the named taxa (*spectrum, sumiderensis*) and describe two new taxa, one of which is a subspecies of the other.

Our cooperation has been made possible by Luis Moreno of the Academia de Ciencias, Instituto de Biología, in La Habana. In addition to specimens secured by Garrido and now in the Instituto de Biología (IB), we have examined the material collected by Schwartz and now in the American Museum of Natural History (AMNH), as well as those in the Museum of Comparative Zoology (MCZ), the National Museum of Natural History, Smithsonian Institution (USNM), and the Oriente specimen in the Charleston Museum (ChM). For the loans of these lizards we are indebted to Richard G. Zweifel, George W. Foley, Ernest E. Williams, George R. Zug, and Albert E. Sanders. Two of the IB specimens have been deposited in the collection of the junior author (ASFS). We are especially grateful to Dr. Günther Peters of the Zoologische Museum der Humboldt-Universität zu Berlin (ZMB) for allowing us to examine not only the syntypes of *A. spectrum* and the holotype of *A. s. sumiderensis* but also his extensive series from the

Sierra de Trinidad. In all, we have studied 160 specimens of this complex, far more than has been previously available to any worker.

*Anolis spectrum* W. Peters

*Anolis spectrum* W. Peters, 1863. Monatsber. Akad. Wiss. Berlin: 136. Syntypes—ZMB 421a–b. Type-locality: "Cuba"; effectively restricted by Gundlach (1875:358) to the vicinity of Matanzas and Cárdenas, Matanzas Province, Cuba; further stated (Gundlach, 1880:51) to have been observed in the jurisdictions of Cárdenas and Matanzas; here restricted to the *mogotes* at San Miguel de los Baños, 500 meters from the swimming pool at San Miguel, before arriving at the Río los Paredones, Matanzas Province, Cuba.

*Anolis spectrum sumiderensis* G. Peters, 1970. Mitt. Zool. Mus. Berlin, 46(1):226. Holotype—ZMB 41783. Type-locality: Valle de Pica Pica near Sumidero, Pinar del Río Province, Cuba. NEW SYNONYMY.

*Distribution:* Known only from the region of the Valle de Pica Pica, Pinar del Río Province, and San Miguel de los Baños, Matanzas Province, Cuba, but doubtless persisting in suitable ecological situations throughout much of western Cuba.

*Definition:* Body long and attenuate with body equal to about 41 percent (36.9–50.0) of tail length, head very narrow and elongate (crocodile-like) with a mean head length/head width ratio of 3.8 in males and 3.9 in females, head deeply concave between canthal ridges, especially in males and with a dark U lying in the concavity; dorsal scales large with very elevated keels, from 7 to 9 in snout-orbit distance and with about 10 enlarged dorsal rows of scales grading abruptly into the small, almost granular, lateral scales which in turn grade abruptly into very large and heavily keeled ventral scales of which there are 12 to 15 in the snout-orbit length; starting at the dorsal midline and counting to above the forelimb insertion, between 16 and 20 scales; no sexual dichromatism in color, both sexes uniform white to ashy in preservative, straw-colored to wood-brown in life and without a differently colored middorsal zone or stripe; a prominent black supra-axillary spot or dot in males; dewlap chestnut to iodine-colored; iris yellowish; mean ratio of snout-vent length to femur 4.2 in males, 3.8 in females; snout-vent length to 42 mm in males and 40 mm in females.

We have examined 22 specimens of *A. spectrum* from the Valle de Pica Pica and 15 from Matanzas Province, including the two ZMB syntypes. Data from the 18 Pica Pica lizards are: largest male 42 mm (IB 1714), largest female 40 mm (IB 1717); snout scales between first canthal scales (reckoned from orbit) 4–7 (mean 5.2; mode 6); scales between supra-orbital semicircles 0 (= semicircles in contact)–2 (mode 0); scales between semicircles and interparietal scale (written as a fraction with right and left sides as numerator and denominator) 1/1 (2 individuals), 1/2 (3), 2/2 (5), 2/3 (1); fourth toe lamellae on phalanges II and III 13–16

(14.3); postmentals 2–4 (mean 2.3, mode 2); loreals 15–25 (19.9); dorsal axilla to groin 26–31 (28.3); scales between dorsal midline and forelimb insertion (= shoulder scales) 16–20 (17.4). Three Matanzas specimens have the following counts: largest male 40 mm (ZMB 421a), largest female 38 mm (IB 2374); snout scales between first canthal scales 4–7 (5.7; no mode); scales between semicircles 0–1 (mode 0); scales between semicircles and interparietal scale 1/1 (1), 1/2 (2); fourth toe lamellae 13–15 (14.0); postmentals 2–4 (mean 2.7, mode 2); loreals 17–21 (18.3); dorsals axilla to groin 27–31 (29.0); shoulder scales 17–19 (17.7).

Comparison of the meristic data from the above two samples (and we admit to the small size of the Matanzas sample[1]) suggests that there are no size or scale count differences between the Pinar del Río and Matanzas lizards. In all cases, extremes are similar or identical, and the ranges of each count in the Matanzas specimens fall within the parameters of the same counts in the much larger Pica Pica sample. We therefore can find no justification for the recognition of *sumiderensis* as a taxon distinct from *spectrum* on the basis of either size or counts. If *sumiderensis* is to be recognized, then it must be on the basis of color or pattern.

The senior author has made the following notes on a male *A. spectrum* from San Miguel de los Baños: dorsal ground color brownish straw; about seven dark brown spots on the back and in the postnuchal area a spot which resembles a pineal eye and is grayish; iris yellowish; a conspicuous black axillary spot; a fine vinaceous line from behind the orbit to the body-tail junction; insertion of base of tail with the hindlimbs ashy white; tibiae with two dark brown bands, thighs with three less conspicuous and clearer brown bands; elbow spot violet-brown; no labial stripe although with a spot of the same color as the elbow spot beneath the orbit; dewlap well developed, iodine-colored with about five clearer bands of scales along its anterior; anal triangle the same color as the elbow.

A male from Pica Pica was recorded by Garrido as being brownish straw-colored, like a dry twig, with the elbows more yellow; neck with a slight vinaceous cast, the beginning of a greenish dorsal region; hindlimbs more brownish; eye whitish or clear yellowish; dewlap iodine-colored with about six longitudinal rows of clearer scales; brownish color clear as far as the throat; venter brownish straw-colored with a slight violet wash toward the midline.

An adult female from San Biguel de los Baños was noted in life by Garrido as uniform brownish above from the neck to the tail; head chestnut-colored as if it had been soiled with red earth; a mark in the shape of a U, colored darker chestnut, on the forehead; about eight brown spots which are like irregular rectangles on the back, quite conspicuous in life, becoming fainter in captivity and becoming only irregular dots

[1] Although the senior author has handled 13 *A. spectrum* from San Miguel de los Baños and took scale counts on them, both the specimens and the counts have been lost. Our comments upon the Matanzas population of *A. spectrum* are thus perforce based upon only three specimens. The other lizards did not differ appreciably from the color data presented here.

after death; limbs deep chestnut-colored, the insertion of the tail with the posterior portions of the thighs ashy white; elbows whitish brown or clear cinnamon; forelimb with two well-defined black dots; eyelids with two or three brownish or streaked lines or rays; gular fan brownish; brownish bands on the tail and toward the base with four or five yellowish rings; two whitish spots in the anal triangle; ventral coloration uniformly chestnut.

W. Peters (1863:138), quoting Gundlach's color data on the original material in life, stated that *Anolis spectrum* was "above brownish straw-yellow, below blackish brown, somewhat violet. The scales on the dorsal surface are reddish. The nares, a double V-shaped line (open anteriorly) in the depression before the eyes, a round spot on the scapula, the center of the upper and lower arm, thigh, and toes, as well as some flecks on the body and bands on the tail, are colored like the ventral surface of the body. Thigh with a white ground color on the rear. The colors are changed, so that they show the following: overall clear brown, only the nares, the V-shaped lines, the round spot on the scapula, a few paired flecks on the back and tail and fine dots on the venter blackish brown. Elbows and knee joints whitish, sharply separated from the blackish sides. Thigh ground color white and with a dark streak on the inner face."

Comparison of Garrido's field notes on the male from Pica Pica with those from the San Miguel male, along with the data presented originally by Gundlach as well as the color information on the San Miguel female, all suggest that there are no differences in color and pattern between Pinar del Río and Matanzas *A. spectrum*. This fact, coupled with the absence of meristic differences, leads us to place *A. s. sumiderensis* G. Peters in synonymy with *A. spectrum* W. Peters and to consider the latter species monotypic.

As far as the habitat and habits of *A. spectrum* are concerned, the species is primarily terrestrial and forages on the ground proper, as well as on small leafy or dry twigs, low shrubs, grass, and on small bushes which may or may not be leafy. The specimens secured at San Miguel were occupying these levels. The female was in open grass and, upon becoming aware of Garrido's approach, jumped in its characteristic manner to hide among the dry twigs of a small plant not more than two feet high. Other individuals were secured on dry leaf litter in the same area, and still others on the foliage of green leaves of the dense trees of the area where the leaves were compact and offered a secure refuge, although the level above the ground was no more than 2 feet.

*Specimens examined:* Cuba, Pinar del Río Province, Valle de Pica Pica, Sumidero, 18 (IB 717, IB 719–23, IB 1710–17, ASFS V20446–47, MCZ 93505, ZMB 41781–83—holotype and paratypes of *A. spectrum sumiderensis*); Valle de Pío Domingo, Pica Pica, 4 (IB 2239, IB 3003–05); Matanzas Province, between Matanzas and Cárdenas, 2 (ZMB 421a–b); 0.5 km from Balneario de San Miguel de los Baños, Lomas del Río Paredones, 13 (IB 2328, IB 2373–74, IB 2702–09, IB 2732, IB 2853).

**Anolis vanidicus** new species

*Definition:* Body elongate and attenuate with body equal to about 42 percent (31.0–48.8) of tail length, head narrow and elongate (but not crocodile-like) with a mean head length/head width ratio of 3.6 in both sexes, head depressed between canthal ridges but not deeply so and with a dark half-moon figure in the depressed area, the figure lighter and generally smaller than that in *A. spectrum*; dorsal scales smaller and with less elevated keels than in *A. spectrum*, from 8 to 13 in snout-orbit distance and with about 7 to 9 enlarged dorsal scale rows grading fairly abruptly into the small, almost granular, lateral scales which in turn grade abruptly into large keeled ventral scales of which there are 18 to 20 in the snout-orbit length; starting at the middorsal line and counting to above the forelimb insertion, between 15 and 34 scales; sexual dichromatism prominent, both sexes brownish green to olive green, the females with a pale wide middorsal band set off from the darker sides and often with a median dark ventral line; no black supra-axillary spot or dot in males; dewlap olive green (varying to pale greenish yellow); iris pale green; mean ratio of snout-vent length to femur 3.6 in males, 3.7 in females; snout-vent length to 39 mm in males and 37 mm in females.

*Distribution:* Known only from the Sierra de Trinidad and vicinity (near Soledad) in Las Villas Province, and north of Santiago de Cuba in Oriente Province, Cuba, but presumed to occur in suitable ecological situations in central and eastern Cuba.

**Anolis vanidicus vanidicus** new subspecies

*Holotype:* AMNH 78400, an adult female, from 4 km W, 12 km N Trinidad (road to Topes de Collantes), Las Villas Province, Cuba, taken 28 July 1957 by John R. Feick. Original number ASFS 3185.

*Paratypes:* (All from Las Villas Province, Cuba.) AMNH 96006, 1.8 mi. (2.9 km) S Topes de Collantes, 12 July 1960, R. F. Klinikowski, D. C. Leber, A. Schwartz; AMNH 78401–10, Topes de Collantes, 30 July 1957, W. H. Gehrmann, Jr., A. Schwartz; MCZ 20290, near Soledad, August 1924, E. R. Dunn; MCZ 21861–64, MCZ 21866–67, Mina Carlota, July 1925, E. R. Dunn; MCZ 22763, MCZ 22765, MCZ 22767–98, western edge of Trinidad Mts., Mina Carlota, toward Cienfuegos, November–December 1926, P. J. Darlington; MCZ 42585, USNM 120760–61, Buenos Aires, 2,500–3,500 feet (762–1,068 meters), 9–14 March 1936, P. J. Darlington; MCZ 74080, MCZ 74082–88, 3–4 km from Topes de Collantes, 27 August 1959, R. Molina, R. Ruibal, E. E. Williams; ZMB 31874–91, Arroyo La Mariposa, 1967, G. Peters; IB 2647–56,[2] IB 2658–

[2] Of this and the following four lots of IB paratypes of *A. v. vanidicus*, only IB 2651 (a male) and IB 2721 (a female) are still known to exist. Due to the uncertainties of American-Cuban postal service, the remainder of these lots (as well as some specimens of *A. spectrum*—see footnote 1) never reached the junior author from La Habana, along with some manuscript and field notes by the senior author. We here include all these specimens as paratypes in the perhaps futile hope that some day they will be located.

74, Cafetal de Gaviñas, 14 July 1969, O. H. Garrido; IB 2710–11, La Mariposa, 6 km SW Topes de Collantes, 8 August 1969, O. H. Garrido; IB 2712–17, IB 2721, Cafetal de Gaviñas, 8 August 1969, O. H. Garrido.

*Definition:* A subspecies of *A. vanidicus* characterized by larger scales (15 to 26 between dorsal midline and forelimb insertion).

*Variation:* A series of 87 *A. v. vanidicus* has the following counts: snout scales at level of first canthal 3–8 (mean 5.5; mode 6), scales between supraorbital semicircles 0 (35 individuals), 1 (50), or 2 (2); scales between supraorbital semicircles and interparietal 0/1 (1 individual), 1/1 (21), 1/2 (9), 2/2 (50), 2/3 (5), or 3/3 (1); fourth toe lamellae 12–16 (13.7); postmental scales 1–3 (mean 2.0; mode 2); loreal scales 15–25 (19.8); dorsal scales between axilla and groin 23–36 (29.9); shoulder scales 15–26 (20.4). Largest male 39 mm (MCZ 21861), largest females (MCZ 20290, MCZ 21866, + two ZMB specimens) 37 mm snout-vent length.

*Description of holotype:* An adult female with a snout-vent length of 36 mm and a tail length of 77 mm (snout-vent/tail ratio 46.8); 7 snout scales at level of first canthal; 2 scales between supraorbital semicircles; 2/2 scales between supraorbital semicircles and interparietal; 14 fourth toe lamellae on phalanges II and III; 2 postmental scales; 24 loreal scales; 32 dorsal scales between axilla and groin; 21 scales between dorsal midline and insertion of forelimb.

Coloration, as preserved, dull tan with a slightly paler middorsal zone encompassing about 7 rows of enlarged dorsal scales; sides slightly darker; a few scattered dark brown to black flecks on the median dorsal scale row on the neck; head unicolor with dorsum and without any prominent markings; limbs brown, with a pale tan spot at the elbows; tail dark brown above, its base with 1 or 2 paler irregular crossbands and several irregular scattered paler areas scattered along its length; venter pale tan without a midventral line.

Preserved females agree well with the above description of coloration and pattern in the holotype. Some specimens (MCZ 74088) are much darker brown laterally, thereby setting off the pale dorsal zone much more sharply than in the holotype. In one female (MCZ 21866) there is a bright white ventrolateral line below the dark brown sides, extending from beneath the eye to the groin. Rarely is there a head figure in adult females; MCZ 20290 and AMNH 96005 (FN 9082) are exceptional in this regard in that they have a dark U-shaped figure in the intercanthal depression. This figure occurs in some young females but is absent in others at the same snout-vent length and collected at the same time. The dark midventral line is equally variable; of 59 females, this pattern feature occurs in 25, ranging in snout-vent lengths from 17 to 37 mm (and thus including both one of the two smallest juveniles and one of the maximally sized females). The presence or absence of a midventral dark line in female *A. v. vanidicus* is not ontogenetic.

Preserved males resemble females in details of pattern and coloration, although no males have a contrasting middorsal zone. If an intercanthal

figure is present (as it is in all juvenile males and in several adult males: AMNH 96006, MCZ 21867, MCZ 22772, MCZ 22781) it is in the form of a sharply truncate V. One male (MCZ 22763) has the intercanthal figure present only as a pair of fine dark parallel lines, and another male (MCZ 74082) has the entire snout, anterior to the position of the V, dark and in sharp contrast to the balance of the head color. The midventral dark line is absent in all males.

The senior author's color notes on a male and a female from Cafetal de Gaviñas, a few kilometers north of San Blas, show the following details. Male: dorsal coloration varying with the incident light but predominantly pale greenish straw, capable of becoming darker (olive); a series of black markings along the median dorsal scales, these markings usually disappearing in captivity; vestiges of a middorsal zone, although much less apparent than in females, and also much paler or more gray than in females; the dorsal zone is much less apparent in wild males than in males kept in captivity; a white line from beneath the eye to the auricular opening; head with a half-moon shaped design in the central depression, although this tends to disappear in captivity; venter the same in both pattern and color as that of the female (see below); dewlap greenish olive with the more central scales weakly yellow, the dewlap color varying from pale greenish yellow to more olivaceous. Another male in the dark phase was recorded as having a black horseshoe shaped intercanthal head marking, the median dorsal band grayish in contrast to the reddish terra cotta sides; venter terra cotta; dewlap darker, almost grayish; the upper portion of the snout clearer than the remainder of the head.

A female from the same locality was recorded as olivaceous brown laterally and on the sides of the head; median dorsal zone straw-cinnamon; a whitish line below the eye; superior portion of snout ashy chestnut-colored without markings; insertion of the hindlimbs and dorsum with a white spot on the olivaceous lateral color, the spot coming to form a triangle with its mate from the other side; three or four dots on the lower posterior face of the thigh; venter yellowish, brightest laterally; remnants of a midventral reddish line from the throat posteriorly; iris pale green.

The junior author's notes indicate that the dewlap was brown, grading to dirty yellow basally.

*Etymology:* The name *vanidicus* is from the Latin meaning "talking vainly" or "lying" in reference to the confusion of this species with *A. spectrum*.

**Anolis vanidicus rejectus** new subspecies

*Holotype:* ChM 55.1.63, an adult female, from 2 mi. (3.2 km) N Santiago de Cuba, Oriente Province, Cuba, taken 24 December 1954 by Daniel R. Stanland. Original number ASFS 117.

*Definition:* A subspecies of *A. vanidicus* characterized by smaller scales (34 between dorsal midline and forelimb insertion).

*Distribution:* Known only from the type-locality in south-central Oriente Province, Cuba.

*Description of holotype:* An adult female with a snout-vent length of 32 mm and a tail length of 82 mm (snout-vent/tail ratio 39.0); 7 snout scales at level of first canthal; 1 scale between supraorbital semicircles; 2/2 scales between supraorbital semicircles and interparietal; 17 fourth toe lamellae on phalanges II and III; 3 postmental scales; 23 loreal scales; 33 dorsal scales between axilla and groin; 34 scales between dorsal midline and insertion of forelimb.

Dorsum brownish in life, with a paler (creamy) middorsal stripe involving 8 enlarged rows of middorsal scales; upper surfaces of limbs and tail concolor with sides but elbows with a tiny cream spot and one weak darker brown crossband on the shank; a very weak intercanthal depression, without a U-shaped dark mark; middorsal pale zone with 2 widely spaced dark brown dots on the midline and a dark U-shaped figure at the sacrum; upper surface of tail with darker and very elongate semireticulum; venter cream and without a median dark line; a pale labial line along the supralabials as far as the ear opening; dorsal and ventral body pigmentation sharply set off from each other, the pigmental transition occurring at the level of the transition from the lateral granular scales to the large keeled ventral scales.

*Comparisons:* Since there is but a single specimen of *A. v. rejectus*, it is difficult to compare this eastern subspecies with more western *A. v. vanidicus*. In all characteristics, the holotype of *rejectus* falls within the known parameters of the long series of nominate *vanidicus*, with one striking exception. The lateral scales are much tinier and more numerous than they are in *vanidicus*, and thus the shoulder count of dorsals and laterals is much higher in *rejectus* (34) than it is in any *vanidicus* (15 to 26). This difference is readily observable in comparison of specimens of the two taxa. As far as the other counts are concerned, the holotype of *rejectus* falls above the mode in *vanidicus* in number of snout scales at the first canthal, agrees with *vanidicus* is having the semicircles separated by one row of scales (the mode in *vanidicus*), has 2/2 scales between the semicircles and the interparietal (the mode in *vanidicus*), has 23 loreals which falls within the range of this count in *vanidicus* (15 to 25) but lies near the upper extreme, has 33 dorsals between the axilla and groin (whereas *vanidicus* has from 23 to 36), and has 3 postmentals (mode of 2 in *vanidicus*) and 17 fourth toe lamellae (12 to 16 in *vanidicus*). The facts that in several counts the sole *rejectus* falls near the upper extreme in *vanidicus*, and that the subspecies is characterized by much smaller lateral scales suggest that, once a series of *rejectus* is secured, this eastern subspecies will be shown to differ from nominate *vanidicus* in generally higher scale counts.

As far as pattern is concerned, the specimen of *rejectus* does not as preserved appear to differ in any feature from some *vanidicus*. The absence of a median ventral line and the presence of a few dark flecks in the pale dorsal zone, as well as the presence of the U-shaped sacral figure are all features which are found in *A. v. vanidicus*. The junior

author's notes on the *rejectus* holotype suggest that its color was more brown in contrast to the olive-greens or brownish greens of *vanidicus*.

*Remarks:* We realize that we may be criticized for naming a subspecies on the basis of a single female specimen; however, the senior author was unable to secure more specimens from the region of the type-locality of *rejectus*, and the junior author never secured additional specimens despite much time spent in the region of Santiago de Cuba. Since *rejectus* differs from all other specimens of *vanidicus* in its much smaller lateral scales, since the only specimen was collected some 470 kilometers to the east of the known range of *A. v. vanidicus*, and since there seems little possibility of our being fortunate enough to secure additional specimens, we have named this taxon.

Schwartz and Ogren (1956:98) stated that the holotype of *A. v. rejectus* was secured "in a clump of waist-high grass" along with *A. argillaceus* Cope. The situation was an open grassy hillside with scattered trees above the Carretera Central. A cemented drainage ditch, about 3 meters deep and perhaps 5 meters wide, was overgrown with tall grasses and low shrubs, and the holotype was taken in this situation.

*Etymology:* The name *rejectus* refers to the fact that Ruibal (1964: 509) suggested that this Oriente specimen was erroneously identified as *A. spectrum*.

## Discussion

Our action in dividing *A. vanidicus* from *A. spectrum* depends strongly on the acquisition of fresh and well-documented material of the latter taxon, which heretofore has been only very poorly represented in collections—namely the two syntypes in Berlin and the third specimen in La Habana. Although we are tempted to regard *vanidicus* and *spectrum* as siblings, and this may well be the case, it is pertinent to note that *A. vanidicus* resembles *A. cyanopleurus* in that both have (especially in females) a contrastingly colored middorsal band. Although we would be very reluctant at this time to suggest that *vanidicus* is more closely related to *cyanopleurus* than to *spectrum*, this may well be the case. *A. cyanopleurus* is an eastern species, limited to the mountains of Oriente Province, and it is also primarily a bright green lizard—basically, it is a green edition of *A. vanidicus*. Ruibal (1964:511), however, pointed out that Gundlach reported *A. cyanopleurus* from near Cárdenas in Matanzas Province, so it is possible that this species had (or still has) a much broader distribution than is currently recognized. Even more intriguing are data on color and pattern in *cyanopleurus*, gathered by the senior author, which suggest that that species, like *A. "spectrum"* is also a composite. Further details of this aspect of the *alutaceus* group (sensu Ruibal, 1964:477) must await more information and specimens.

It is possible that some workers will feel that, by recognizing two species (*A. spectrum* and *A. vanidicus*), rather than two or more subspecies of *A. spectrum*, we have erred in the direction of multiplication

of specific entities. This is, of course, a possibility. It is quite possible that *spectrum*, *vanidicus*, and *rejectus* are better interpreted as a west-east series of subspecies rather than as two species. There are few absolute scale count differences between *spectrum* and *vanidicus*; an exception is ventral scales in snout-orbit distance (12 to 15 in *spectrum*, 18 to 20 in *vanidicus*), and dorsal scales in snout-orbit distance overlap but slightly (7 to 9 in *spectrum*, 8 to 13 in *vanidicus*). The major features of differentiation between the two taxa are involved with color and pattern. But none of the above assures the worker that he is dealing with species or subspecies. The chance of finding both taxa sympatrically is obviously extremely remote, and this relatively certain criterion for species (rather than subspecies) relationship is best discarded in this particular instance. Our arrangement, then, of *spectrum* and *vanidicus* as species is inductive. We feel strongly that the differences between these taxa are such as we and others would elsewhere regard as being of specific, rather than of subspecific, rank. Since anoles are primarily eye-minded lizards, a fact which is by now well documented and has been additionally confirmed by field observations, it seems reasonable to assume that differences in pigmentation and pattern are of primary importance in species differentiation and should not be considered as incidental to often more orthodoxly regarded morphological and scutellogical characteristics. Garrido, in a forthcoming comprehensive work on Cuban anoles, will show that *spectrum* and *vanidicus* are ethologically distinct.

We interpret *A. spectrum* as a species which evolved in the Pinar del Río massifs (Sierra del Rosario-Sierra de los Organos). From this center, *A. spectrum* has invaded at least as far west as the limestone Bejucal-Madruga-Limonar anticline at San Miguel de los Baños and the Llanura Roja in the Matanzas-Cárdenas area. It is perhaps pertinent that the two recent collecting stations for *A. spectrum* are in karst regions, areas where forests have persisted, since lumbering in such situations presents physical problems which are difficult to solve. It is not unlikely, however, that *A. spectrum* at one time was more widely distributed in these western Cuban lowlands when they were more forested and less cultivated than they are today. There are still many areas between Pica Pica and San Miguel de los Baños where forest, often on a limestone base, remains; it is not unlikely that *A. spectrum* will be found to persist in such regions.

We interpret *A. vanidicus* as being a species which evolved in the Sierra de Trinidad; surely it is an abundant lizard in that range. In our experience it is a lizard of openings in forest, where at night the species sleeps on grass, ferns, and vines, within 1.5 meters of the ground. The holotype of *A. v. vanidicus* was secured, however, asleep on a leaf of a shrub in a fully wooded situation, so that perhaps *A. vanidicus* is better regarded as a forest-dwelling lizard that is more commonly encountered (or more easily collected) in forest openings than in the forest itself. Garrido feels that *A. vanidicus* is quite localized in the Sierra de Trinidad, and that there are more or less widely scattered populations (= colonies) where

the species is abundant, scattered throughout a large general area where the species is very uncommon.

The ecology of *A. v. rejectus* is totally conjectural. The open and relatively treeless hillside where the only specimen was taken is so very different from the shaded and moist forests where *A. v. vanidicus* occurs that it is certain that this is not the natural habitat of the Oriente subspecies. The fact that the holotype was secured in an open, cemented, and overgrown drainage ditch suggests that the lizard might have reached this locality during a period of flooding, i.e., it had been washed there from its normal habitat. The Sierra de Boniato lies to the north of the type-locality of *A. v. rejectus* and much of this range is still moderately well forested. It remains to be determined if *A. vanidicus* is very widely distributed in Oriente, and if so, what its ecology is there. It is remarkable that, with all the recent field work in various sections of Oriente, the senior author has not collected additional specimens of *A. vanidicus* in that province.

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